

Nuclear Energy Challenges in the Former Soviet Union

By Robert E. Ebel*

It was cold that morning in early March when the Russian fighter pilot slipped into the cockpit of his aircraft. Training missions were few and far between. Fuel was scarce and most pilots had been unable to keep up their flying skills. He hadn't been in the air for some time now, and he wondered whether he had lost his touch.

His orders were simple. Test his marksmanship. Fire air-to-surface missiles at selected ground targets. The sky was clearing in this southwestern portion of Russia as he took off. Soon he was over the target range. His first firing passes went well. Then disaster struck. A fired missile went astray. He notified ground control and returned to base.

Only later did the pilot learn that his errant missile had struck a scant 4 kilometers from the NovoVoronezh nuclear power plant. There are three operating reactors at NovoVoronezh – two VVER 440 reactors and one VVER 1000. Two earlier VVER reactors had been shut down a number of years ago. Net generating capacity at NovoVoronezh is 1,720 megawatts, making it one of the larger nuclear power plants in Russia.

This is what I call my Tom Clancy scenario. It has the makings of a great story.

But there is a difference. While many of Tom Clancy's scenarios are fanciful, the scenario I have just described for you actually happened. It happened in March 1995, a missile did go astray and did strike within 4 kilometers of the NovoVoronezh nuclear facility. Authorities later calculated that had the angle of fire been changed just 2 degrees, the missile would have struck the plant dead center.

When a military spokesman was questioned later by the press as to why a target range would be laid out so close to a nuclear facility, he just shrugged his shoulders. "We were here first," was his reply. "The nuclear plant was built later."

There is a financial crisis in Russia today, especially in the energy industry. Huge debts are piling up simply because there is no enforcement mechanism to ensure payment. The household user does not pay his electrical bill, knowing full well that he will not be cut off. That means the seller of electricity cannot pay for the coal, fuel oil or natural gas he has been burning. And that means the producer of coal, oil and natural gas has no money to pay his workers, to carry out equipment repairs and maintenance, and certainly no capital for new construction.

The Russian nuclear power sector has been suffering along with everyone else. Less than two-thirds of the power generated was being paid for. Cash payments covered little; most payments were in the form of barter. Salaries had not been paid for several months.

Not long ago a particular military establishment had been delinquent in paying its electricity bill. Arrears were getting higher and higher, and the local power station was becoming increasingly frustrated. What to do? The plant decided on

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its own to cut the power to this military facility. Now, this was no ordinary facility; it was something quite special. It was a naval depot, a home for nuclear subs. A decision to cut the power off nearly caused a propulsion reactor meltdown.

One last note of concern. There is a floating nuclear waste container, the ship Lepse, which is anchored within the city limits of Murmansk, on the Barents Sea. Lepse holds nuclear waste from Russia's three atomic-powered ice breakers and nuclear waste from the Northern Fleet's atomic-powered submarines. The on-board nuclear waste has a total radioactivity of 700,000 curies and, in the judgment of environmentalists, poses a potential threat three times that of Chernobyl. Western experts are now studying how to extract nuclear waste-filled containers from the Lepse so that the waste could be processed or at least stored elsewhere.

I relate this anecdotal evidence to you as a way of underscoring that the next nuclear accident in Russia or in the former Soviet Union, if there is one, may not be related to design errors or operator mistakes at a nuclear power plant, as it was at Chernobyl.

We need recall that Chernobyl was not the first nuclear-related disaster in the former Soviet Union. The first came in September 1957 when a nuclear waste facility at Kyshtym, a secret site near Chelyabinsk, exploded, contaminating a huge area. Ten years later, another disaster struck, again associated with nuclear waste.

For a number of years nuclear waste had been dumped into Lake Karachay, also in the Chelyabinsk region. The waste originated at Mayak, a secret city where nuclear weapons were being made. The lake evaporated during the long hot summer of 1967. Winds picked up radioactive dust from the dry lake bed and contaminated land and people as far as 50 miles away.

Both the Kyshtym and Mayak tragedies were kept secret for years afterwards.

The country is full of opportunities for a nuclear disaster but the West continues with its obsession that the two Chernobyl reactors must be shut down. A Memorandum of Understanding was signed last December between the government of Ukraine on the one hand and the G-7 and European Union on the other. This Memorandum focuses on the closure of Chernobyl by the year 2000, if adequate financing is forthcoming.

Let's presume that financing will become available and that the two Chernobyl reactors are shut down. Are our worries over? Of course not. There will still be 13 more Chernobyl-type reactors to go: 11 in Russia and 2 in Lithuania. Are we prepared to fork over billions to secure their closure as well? The Memorandum securing the closure of Chernobyl provides for grants and loan financing totaling in excess of \$3 billion. Simple arithmetic tells us that following the Chernobyl precedence for all remaining similar reactors would cost the West \$30 billion. Doable, of course, but I doubt that the political will is there and without the political will, nothing will happen.

General Concern For Nuclear Safety

Near the close of the June 1995 summit of G-7 member-countries, Russian President Boris Yeltsin proposed that they meet early in 1996 to address a number of issues relating to nuclear safety. The G-7 approved his proposal and met in a

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mini-summit in Moscow on April 19-20, 1996. This mini-summit, in my judgment, had quite modest goals in mind, and these goals were basically met.

There were no surprises. The G-7 reaffirmed its commitment to provide \$3 billion in loans and grants to support the closing of Chernobyl by the year 2000.

Perhaps the best that can be said is that nuclear safety concerns were raised to international level, where they belong. In the past, these concerns have largely been discussed on a bilateral basis.

1995 Russia

The Russian nuclear power industry ended the year 1995 with a smile on its face. Russian nuclear power plants generated a total of 99.3 billion kilowatt-hours that year, for a modest gain of just 1.5 percent. Why the smile then? Because all other forms of energy – coal, crude oil, and natural gas – continued their production declines. To give you a sampling of what has been happening in Russia's energy sector, consider this. The production of crude oil has fallen from 11.4 million b/d in 1988 to just 6.14 million b/d in 1995. This loss of more than 5 million b/d is unprecedented in world history. Throw in comparable losses in coal and declines in natural gas extraction, and the stability of nuclear power becomes even more welcome.

Nationally, nuclear electric power supplied about 11.5 percent of electricity generated in 1995, or half the relative share of nuclear energy in the U.S. But that is not the story. Virtually all the nuclear power stations are located in European Russia, that is, the area west of the Ural Mountains. Here domestic fuel production is limited. Thus, nuclear's role is local and regional, not national.

Ukraine

Ukrainian nuclear power also ended 1995 on an upbeat note. A new reactor had been completed and brought on-line at Zaporozhe, making this facility at 6,000 megawatts the largest in the former Soviet Union and in Europe. Last year nuclear plants generated 70.5 billion kwh or about 37 percent of the national total.

Earlier I mentioned a Memorandum of Understanding which hopefully will lead to the closure of Chernobyl by the year 2000. Unfortunately, anyone who examines this Memo-

randum closely will be struck by its vagueness. There is far less here than meets the eye. But its vagueness spells trouble ahead if the grants and loan financing are not forthcoming. Ukraine has already let it be known that the financing arrangements spelled out in this Memorandum – some \$500 million in grants and \$1.8 billion in projected investments by international lending institutions – are wholly inadequate for the tasks at hand.

To offset the loss of generating capacity at Chernobyl, an unfinished reactor at Khmel'nitskiy and another at Rovno are to be completed.

Ukraine has been playing political hardball with Chernobyl and will continue to do so. After all, Ukraine has few points of leverage left to it, and it can be expected to take the fullest advantage of the Western desire to have Chernobyl shut down.

Armenia

Armenia too can look back on 1995 with a sense of satisfaction. Reactor no. 2 at the Medsamor nuclear power plant, which had been shut down since 1989, was put back in operation, with the substantial help of Russia. Armenia essentially has been shut off from outside sources of oil and gas because of a blockade imposed by Azerbaijan. Electricity availability was down to 1 to 2 hours a day. A decision to restart Medsamor was not all that difficult to make, despite opposition from the U.S. and others.

Lithuania

That leaves Lithuania as the only other republic of the former Soviet Union with a nuclear power industry. There is no country in the world more dependent upon nuclear power than Lithuania. Today in Lithuania, close to 90 percent of power generation comes from the Ignalina nuclear power plant, with its two 1,500 Mw RBMK reactors. Trying to convince Lithuania to close down Ignalina under these circumstances would be useless. Scandinavia instead has been working to support safety upgrades, the only acceptable approach.

Indeed, there is growing opinion in the West that the past policy of seeking reactor closure before financial aid would be provided was patently wrong and counter-productive. Pursuing this policy kept safety upgrading at undesirably low levels. A more enlightened approach now seems to have taken over.

Conference Proceedings 19th IAEA International Conference Budapest, Hungary, May 27-30, 1996

The Proceedings from the 19th International Conference of the IAEA held in Budapest, Hungary, are now available from IAEA Headquarters. Entitled *Global Energy Transitions, with Emphasis on the Last Five Years of the Century*, the proceedings are available to members for \$55.95 and to non-members for \$75.95 (includes postage). Payment must be made in U.S. dollars with checks drawn on U.S. banks. To order copies, please complete the form below and mail together with your check to:

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There was some excitement surrounding Ignalina last year. On two separate occasions threats were made against this nuclear facility. Nothing came of these threats, but downwind Sweden has stepped in to strengthen security procedures in and around the plant.

Looking Into the Crystal Ball

I do not anticipate any dramatic change on the horizon for nuclear power in the former Soviet Union or in Eastern Europe. Nor can I think of any scenario that might suggest approval of an expansion program which would take nuclear power generation well beyond today's level. Given this comparatively modest role, nuclear power is unlikely to exert much influence on the production and export of other fuels.

There will be new reactor construction, of course, but the net gain in generating capacity should be relatively small. We should anticipate a comparatively sizable reactor construction program in the Soviet Far East. This area lacks its own fuel base and is at the end of an obsolete, overworked, and unreliable fuels and energy delivery system. Local nuclear power would improve matters considerably.

In the 1980s the former Soviet Union had the world's largest nuclear construction program in place. That program called for 200 gigawatts of generating capacity to be available by the year 2000. Then along came Chernobyl. The program was put in a deep freeze and there it has stayed.

Russia recently has developed an energy strategy to take the country to the year 2010. For nuclear electric power the goals are very modest: a minimum of 125 billion kwh by the year 2010; a maximum of 160 billion kwh.

The Russian Ministry of Nuclear Power is very ambitious, reflecting the personality of its leader, Viktor Mikhaylov. But he understands that if his Ministry is to remain solvent, let alone grow, it will have to seek business outside Russia and outside the former Soviet Union.

This search for new business is very apt to further confrontation between Russia and the U.S. The U.S. lost out in its efforts to keep Russia from contracting to complete the Bushehr nuclear power plant in Iran. The U.S. opposed the reopening of Medsamor, but lost out again. We should expect more confrontations in the coming years as Russia pursues reactor construction in Pakistan, India, China, North Korea and elsewhere; perhaps even in Cuba, where work stopped on the Juragua nuclear power plant in 1992.

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1997 Nominees Announced

At the Budapest Council meeting, Jean Masseron, Past President and Chairman of the Nominating Committee announced, on behalf of the Nominating Committee, the following 1997 officer slate:

For President-Elect	Charles Spierer
For VP of International Affairs	Guy Caruso
For VP of Finance	Edgardo Curcio
For Treasurer	Pieter Vander Meiren

Other members of the Nominating Committee were: Alberto Clo, Alioune Fall, Fereidun Fesharaki, John Ferriter, and Adrian Lajous.

President-Elect, Dennis O'Brien, will automatically move up to President in 1997. Ballots will be mailed shortly.

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General conference sessions cover:

- Trends in transport energy demand and environmental constraints.
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- Life-style changes and the transport sector.
- Megacities: Solutions to the transport and air pollution problems.
- Effectiveness of public policies, transport and energy sector.
- Method, models and data.

The conference will conclude with a panel discussion addressing the important issue of national vs. international aspects of transport, energy and environment.

The conference is organized jointly with the International Association for Energy Economics (IAEE) and the European Foundation for Cooperation in Energy Economics (EFCEE).

To obtain a copy of the preliminary conference program including registration form and for further information please contact:

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